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ABSTRACT

The development of narrative competence is an important part of the English curriculum in the early secondary school years. A study examined how four seventh-grade girls (two novice and two expert writers) responded to computer-based metacognitive guidance in the form of procedural facilitations. The facilitations were designed to assist the transition in story writing from a simple knowledge telling approach (a chronicle or listing of events) to a knowledge transforming approach (weaving or transforming multiple events, activities, and characters into a unified meaning structure). The procedural facilitation in this study was provided by a computer-based tool called the "Writing Partner," and students participated in the computer-supported activities over a 10-week period as part of regular classroom writing activities. An examination of cognitive responses manifested in text construction activity traced students' responses to this metacognitive guidance. Results showed that, for the two novice writers, participation in supported writing contexts was associated with a shift toward use of knowledge transforming strategies, improved story quality, and greater metacognitive knowledge of narrative text construction. For the two expert writers, whose stories already embodied characteristics inherent in a knowledge transforming approach to writing, the procedural facilitations served to refine existing competencies in constructing narrative text. (Two figures of data and 23 references are attached.) (Author/SR)

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A micro analysis of learners' responses to procedural facilitations provided by the *Writing Partner*

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Abstract

The development of narrative competence is an important part of the English curriculum in the early secondary school years. Many students though, experience considerable difficulty with the conventions of narrative texts. Typically, poor writers' stories are little more than a chronicle or listing of events (knowledge telling). Accomplished writers, on the other hand, are able to weave or transform multiple events, activities and characters into a unified meaning structure (knowledge transforming). The present study examined how four grade seven girls (two novice and two expert writers) responded to computer-based metacognitive guidance, in the form of procedural facilitations, designed to assist the transition from knowledge telling to knowledge transforming approaches to story writing. Students participated in the computer-supported activities over a ten week period as part of regular classroom writing activities. This paper traces the cognitive responses manifested in text construction activity in response to the metacognitive guidance. Novice and expert writers' differing responses to the procedural facilitations are interpreted in the light of conceptualisations of knowledge telling and knowledge transforming approaches to writing. For the two novice writers, participation in supported writing contexts was associated with a shift toward use of knowledge transforming strategies, improved story quality, and greater metacognitive knowledge of narrative text construction. For the two expert writers, whose stories already embodied characteristics inherent in a knowledge transforming approach to writing, the procedural facilitations served to refine existing competencies in constructing narrative text.

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Narrative production is a complex activity in which writers must coordinate the transformation of ideas into a meaningful linguistic whole that will attract and sustain reader interest. This transformation involves a number of subprocesses- planning, drafting, revising, editing, and publishing- and is dependent on their careful orchestration (Bereiter and Scardamalia 1987; Hayes and Flower, 1980; O'Flahavan and Tierney, 1991). Metacognitive processes, such as planning, monitoring and evaluation are important components of the orchestration process. Mature composing involves such metacognitive questions as: Is this what I mean to say? How else could I say it? How can I explain what I want to say most clearly to my reader? How can I make sure my reader knows what's going on in my head? The writer's responses to such self-regulatory questions act to shape story composition in the light of a strong sense of purpose and audience (Bereiter and Scardamalia 1987; Biggs and Telfer, 1987; Hayes, 1990). Skilled story writing involves filtering personal views, assumptions and ways of expressing ideas through judgements about the meaning to be conveyed, the prospective reader's background and experience, and what effect the story should have on its audience. Less mature writers are unlikely to activate such a complex set of metacognitive processes. Encouraging junior secondary students to see that writing is a matter of careful orchestration of these processes, so that intent and meaning are clear to the reader, is a major challenge in teaching writing in today's classroom.

Extending the notion of mature composing as a complex process, Bereiter and Scardamalia (1987) have proposed two general models of generating text content. One model, *knowledge telling*, makes writing a fairly natural task, drawing on existing cognitive structures, especially those relating to everyday language competence. This process employs readily available knowledge enabling children to write down what they know about a topic, especially if based on personal experience, relatively easily. The other model, *knowledge transforming*, involves the reprocessing of knowledge exceeding that generated by normal conversational language. It is a process dependent upon sustained mental and metacognitive effort, and on factors including the writer's command of oral language, especially syntactic fluency, knowledge of the topic of discourse, and sophistication with relevant literary genre. Specifically, according to Bereiter and Scardamalia (1987), thoughts come into existence through the composing process itself, "beginning as incohate entities and gradually, by dint of much rethinking and restating, taking the form of fully developed thoughts" (p. 10). Central to this construction of knowledge is the "reworking" of thoughts so that text says what it is intended to say, in terms of both sense of audience and author understanding.

Bereiter and Scardamalia (1987) and Zellermayer, Salomon, Globerson and Givon (1991) contend that knowledge transforming is dependent on a range of metacognitive activities such as goal-directed planning guided by mental representations of plot and audience, diagnosis of problems arising from the gap between these representations and the evolving text, and evaluation of means required to close this gap in revision. The importance of these metacognitions lies in the explicit information and guidance they afford text construction. Yet, despite their orchestrating role in text composition, and amenability to classroom instruction (Paris and Winograd, 1990), metacognitive processes are seldom explicated in writing instruction.

In highlighting the importance of metacognitive strategies to knowledge transforming processes, Bereiter and Scardamalia (1987) contend that appropriate self-regulatory mechanisms necessary for mature composing might already be available to unskilled writers, but in underdeveloped and undifferentiated forms. To nurture their development they propose the use of scaffolding procedures, in the Brunerian sense. These procedures they suggest, might be more effective in developing self-regulatory mechanisms within a learner's existing executive cognitive structures than more direct teaching, because it places less stress on an already stretched cognitive processing system. Labelled *procedural facilitation*, this form of scaffolding minimises the cognitive demands imposed by the emerging self-regulatory mechanisms by providing

memory supports, guiding, modelling and cueing higher order processes involved in text construction (Zellermayer et al., 1991). In the Vygotskian sense, the communicationally explicit guidance afforded by the procedural facilitations serves to mediate compositional processes in the cognitive space between what can be accomplished alone and problem-solving in collaboration with more capable others (Vygotsky, 1978). Ultimately, it is hoped that the guides are internalised for use in a non-assisted context.

Procedural facilitation has been applied in a small number of studies exploring writing processes in classrooms and found to be instrumental in affording a means of encouraging movement from knowledge telling to the more mature knowledge transforming mode of composition (Beal, 1989; Scardamalia and Bereiter, 1985; Scardamalia, Bereiter, McLean, Swallow and Woodruff, 1989). More recently, a computer-based tool (the *Writing Partner*) that provides procedural facilitations has been used successfully to guide knowledge transforming operations in writing contexts with the aim of improving subsequent writing performance (Zellermayer et al., 1991). Findings from current studies using the *Writing Partner* (the subject of this Symposium), highlight several psychological and contextual variables affecting compositional processes and writing performance in this environment.

The major contribution of computer generated procedural facilitations is twofold: first a computer can provide the desired guidance through the entire writing process on a one to one basis; a situation quite difficult, if not impossible to provide in a regular teaching environment; secondly, the computer environment has the potential to generate a unique "intellectual partnership" that acts to stretch thinking processes, expand "cognitive workspace" and facilitate internalisation of metacognitive processes. This intellectual partnership may enable a learner to function at a level that transcends the limitations of what could be accomplished alone (Pea, 1987; Salomon, 1990; Salomon, Perkins and Globerson, 1991). This is not to say that internalisation of metacognitive supports proceeds automatically. Indeed, there are a variety of cognitive, affective and situational variables that predicate and mediate internalisation, both in writing and other learning contexts (Paris and Winograd, 1990; Salomon, 1990; Salomon and Perkins, 1989). In the case of the *Writing Partner*, internalisation of metacognitive guidance and subsequently improved performance has been linked to students' mindfulness and expenditure of effort during learning activities (Zellermayer et al, 1991). As yet though, little is known about relationships between cognitive and/or affective aspects of learner behaviour, prior textual and linguistic experiences, and compositional processes in metacognitively guided environments.

In view of such considerations, the present study builds on and complements the work of Zellermayer et al., (1991) and other research reported in this Symposium, by providing an indepth exploration of skilled and unskilled writers' cognitive responses to the procedural facilitations afforded by the *Writing Partner* as manifested in text composition and metacognitive awareness of narrative writing. The aim of such a fine-grained examination of writing behaviour was to develop a clearer understanding of processes used by young novice and expert writers in activating knowledge transforming approaches in a scaffolded context and, in doing so, to identify contextual factors mediating the development of narrative competence and the processing and internalisation of metacognitive supports. Research of this kind has the capacity to provide rich and elaborated information on learning processes. Of particular interest, was whether metacognitive supports would facilitate novice writers' use of knowledge transforming composition strategies, whether use of such strategies would be associated with a better understanding of the metacognitive processes involved in writing, and ways in which processing and internalising the guides differed for novice and experts. So, I expected that experiences with the *Writing Partner* would be most beneficial for poor writers, whose knowledge telling writing approach is constrained by lack of effective metacognitive strategies necessary for the orchestration of writing subprocesses (Bereiter and Scardamalia, 1987; Zellermayer, 1989) and poor knowledge of the

conventions of narrative text genres (Flower and Hayes, 1980; Gilbert, 1990; Hayes, 1990). I expected the guides to be less helpful to skilled writers, whose composition processes already resembled those embodied in knowledge transforming model. Insights into ways in which novice and expert writers differ in their responses to the metacognitive supports, and the processes they employ to internalise such supports, have important implications for understanding skilled writing.

Procedures

Development of a detailed picture of students' responses to the *Writing Partner* supports in a naturalistic learning environment, entailed continuous observations of writing behaviours, supported by on-line questions to clarify and elaborate writers' responses to the procedural facilitations, and interviews administered on an individual basis. Responses to the metacognitive facilitations as manifested in writing (planning, composing and revising) or conversations with peers were noted in shorthand form.

Participants and setting Two poor writers (Lee and Michelle) and two skilled writers (Kate and Robyn) used the *Writing Partner* over a ten week period to complete scheduled narrative writing activities. The novice writers were part of a larger group of low achieving writers whose writing efforts were assisted by the *Writing Partner* (Elliott, Hendry and King, in preparation). The students, all in grade seven (age 13) and from middle class Anglo-Australian family backgrounds, attended a girls only secondary school that makes considerable use of computer-based learning activities across the curriculum.

The two novice writers were selected (by the school's English coordinator) for participation in the study because, while of average (Michelle) and above average (Lee) ability, and coping well with most school subjects, both girls were identified as being hampered across all areas of the curriculum by poor writing skills. The expert writers, (Kate and Robyn), both of above average general ability, were selected because they would benefit from the challenge of using a new writing tool. Each girl was already familiar with word processing.

The girls had five one hour English periods per six day cycle and used the *Writing Partner* in the two periods normally devoted to writing. As was the usual practice, story topics were student-selected but developed from themes generated by novels, poems or contemporary events studied in class and composition occured within the "process" of "conference", appraoch common to many Australian and North American writing classrooms (Graves, 1983; Florio-Ruane, 1991).

The Writing Partner Based mainly on Bereiter and Scardamalia's (1987) theory and research, the *Writing Partner* was designed to improve writing by providing metacognitive-like questions, support and guidance, to scaffold knowledge-transforming processes (Zellermayer et al., 1991). In serving to promote these strategies the *Writing Partner* provides procedural facilitation consisting of routines and external aids aimed at reducing the processing burden involved in bringing self-regulatory mechanisms into use during text construction. In doing so, it guides the writer through: (a) the planning phase (consideration of audience, rhetorical elements, goal, the generation of story highlights, brainstorming story ideas and so on), (b) the composing phase (continuous examination, elaboration, monitoring and evaluation of story ideas and structure by means of guiding questions of a metacognitive nature), and (c) the revising process, through guiding questions that promote two-way reflection on both rhetorical and content aspects of text, as well as on writing mechanics (Zellermayer et al., 1991).

Introductory activities Training to use a Macintosh-based word processor and to develop familiarity with the features of a *Writing Partner* extended over a six to eight week period and involved planning and writing a "fractured fairy tale" or "revolting

rhyme". This process was assisted by the use of a paper-based guide that mirrored the structure of the *Writing Partner*.

Observational data Detailed observations of students' cognitive and affective responses to the *Writing Partner* were made during most of the writing sessions. Students' non-verbal reactions and self-talk, their conversations with the participant observer and with peers, and their writing behaviours were recorded. As part of the observational process observers asked specific questions (of the type indicated below) to probe aspects of the thinking that framed text construction in response to the metacognitive facilitations.

> What did you just do?
> What do you mean by X?
> What are you going to do next?
> How did that help you?
> How will you use this information now?
> Why did you do that?

Writing evaluations Three stories (one from the pre *Writing Partner* period and two produced with *Writing Partner* assistance) were assessed by two evaluators unfamiliar with the *Writing Partner* and the study, but familiar with the level of writing typical of grade seven students. Stories were evaluated according to an analytic scale identifying six criteria (overall global impression; plot(s); characterisation; mood; setting/time; dialogue; expression; mechanics) believed to represent the extent to which a story manifests features reflective of knowledge transforming processes (Zellermayer et al., 1991). The evaluation process used a 1-5 scale with higher scores assumed to reflect better planned and better revised stories. There was strong inter-rater reliability (> .90) across the six criteria at each assessment point.

Metacognitive knowledge Insights into students' metacognitive knowledge about narrative writing (planning, composing, and revising text), believed to reflect understanding of the writing process, were through unstructured guided by the question, *What would you tell a friend who wanted to write a good story, one that would be interesting, and get a good mark?* Each girl was interviewed before and after exposure to the *Writing Partner*.

Knowledge telling and knowledge transforming

Pre Writing Partner stories At the commencement of the study comparisons between novice and expert writers' metacognitive knowledge of narrative processes, and their narrative texts, revealed clear distinctions reflecting major characteristics consistent with knowledge telling or knowledge transforming approaches to writing. Consistent with Bereiter and Scardamalia (1987) view of knowledge transforming, the skilled writer's (Robyn) description of how to write a good story reflected considerable awareness of metacognitive processes involved in writing.

> **Expert Writer** (Robyn)
>
> I go about planning my ideas...get them in order, so I have a beginning a middle and an end....Then I look at what my main ideas are going to be. I work out what's actually going to happen.
>
> Mmmm...then I work out characters, who's going to do what, their appearance and their background. I do some research on what the characters are going to be like. Sometimes I go to the library ...what sort of vocabulary they are going to use.
>
> Then I try to do something with the beginning. I try to start off with an interesting beginning. Mrs X told us we are to have a good start so people are interested. The start needs to get someone's attention. Otherwise they won't want to read on.

Then I'm away.

I check if the story makes sense and if it sounds interesting. I look at what the people do and what they're like. I try to see if I can make it more interesting. Stories have to be interesting or people won't read them.

I change things to make them better. I make sure everything makes sense and is in the right order. I check for mistakes as I go. If I see a mistake like a wrong word I fix it up. If I'm not sure about a word I check it in the dictionary or ask someone.

In contrast, concerns of the novice writers, as illustrated by Michelle's comments, were with "what to say and how to say it"; there was little sense of intentionality, planning or audience. Both Lee and Michelle's descriptions of narrative construction reflected a chronicle-like or linear organisation, with content presented in the same form and order as it came to mind, and little attempt at transformation into meaningful linguistic messages.

Novice Writer (Michelle):

I think of a title...think of what I'm going to write in the story
And how do you do that?
It takes about 5 minutes. I get a picture in my head.
What sort of picture?
What sort of story I want it to be...
Then I write about what I thought. And then just keep writing ...I suppose.
How do you know what to write? How do you decide what to put where?
I think of one sentence and then I just try to carry on.
Anything else? No, that's it.
What do you do when you've finished your rough copy?
When I've finished I read through it. I fix the spelling, then I go to Mrs K and Mrs K will conference.

Further evidence of distinctions between knowledge telling and knowledge transforming was found in assessments of pre *Writing Partner* stories. Overwhelmingly, the novice writers' stories were writer-based rather than reader-based, truncated, and rarely more than a chronicle or listing of events as indicated the following extract from Lee's story.

My two friends and I were on an island and this is how we got there. We were on a cruise to the Pacific Islands but we were hit by a hurricane and we were all told to stay in our cabins. We went out on the deck and were standing at the edge of the ship and a big wave about 10 metres high hit the ship and we got pulled overbord into the raging sea. 1 of the crew men got out some life boys and we caught them but but he couldn't see us so he reported 3 people over bord to the captain....

In keeping with the knowledge telling approach, revision was generally a rewriting of the text to make it look more presentable. According to Michelle and Lee, their first drafts were essentially their final product. While both made some changes to the spelling, punctuation and grammar, revising focussed primarily on text mechanics at the expense of continuity of ideas to form a whole. As Lee said of her revising:

I check the spelling. Then I take it to Mrs K. Then I rewrite it with correct spelling. I think that's all. It's done then.

More closely aligned to the knowledge transforming model, the expert writers (Kate and Robyn) focussed on ideas and audience at a relational level. Both girls developed their characters well and weaved together the complex threads of events and incidents to form a plot. Both indicated that stories were planned in advance and that they were sensitive to audience perspectives throughout composition. Their revision involved attention to both the mechanics of text and to linking ideas to form the story as a whole. As Kate said of her editing prior to the use of the *Writing Partner*:

...I think about how it will all link up so it's not disjointed.... I check it makes sense or if something sounds better than something else...I just make sure it sounds good because that's important. People have to read it!

From knowledge telling *to* knowledge transforming

Planning with the Writing Partner The *Writing Partner* first guides students through the process of planning a story. Initially this involves nomination of a target audience (eg. readers of the same age) and a story mood. The writer is then assisted to develop a story outline indicating several major and minor story events or *highlights*, to identify characters, to brainstorm story ideas, and to organise these to form plots and sub-plots.

Differences between the novice and expert writers' responses to the planning guides were immediately obvious. The novices, Michelle and Lee, generally laboured over topic selection and plot direction and had little idea of character identity, let alone development or role in the plot.

For each new story the novices devoted one or more full (one hour) sessions to planning. Yet, their plans were poorly developed in comparison with those of the more accomplished writers. The experts generated story ideas quickly and moved speedily through the planning process. Both Kate and Robyn voluntarily accessed *Writing Partner* information about story planning to "refresh" their memories about each step of the process. They sought information about audience, mood, and plot development, and read it carefully. Neither Michelle or Lee voluntarily sought planning information and when prompted by the *Writing Partner* to seek help, generally did not. They did however, most reluctantly in the case of Michelle, consult the guides at the direction of the observer who advised this strategy when their planning stalled.

As the study progressed the experts' planning remained much the same, with a continuing concern for meaningful plot development. Their planning was spirited, purposeful and conceptual in nature. Rather than concentrating on specific (and minor) incidents, they configured occurrences within a broader framework that considered both the development and outcome of the story. Even with *Writing Partner* assistance, Lee and Michelle's planning resulted in a chronological or diary-like list of events or incidents with little overall conceptualisation or organisation to form a schematic whole. However, the "forced" nature of planning ensured, perhaps for the first time, a conscious focus on, and articulation of, story purpose, development and outcome prior to writing. Subsequent improvements in novices' writing performance suggests this was useful.

Composing Having guided students to plan their story the *Writing Partner* prompts the development of settings, characters, plots, and dialogue in accordance with story purpose and direction. For Robyn and Kate settings were quickly established enabling characters to be described and drawn into events or incidents. Characters' motivations and their placement in specific situations determined their development in relation to the overall direction of the story. At all times Robyn and Kate were cognisant that their story had to make sense to the reader. As they developed major plots and sub- plots, they drew perceptions, incidents and actions together in clearly causal sequences from beginning to end, within their overall meaning structure.

The experts' strong sense of audience is reflected in the following illustration of Kate's text reworking in an attempt to convey the intended impression to her reader/s.

Attempt 1. "I sure will Carl", Jeannie's father said...

Attempt 2. "I sure will Carl", his talking was laboured...

Attempt 3. "I sure will Carl", his talking was soft and his breathing laboured.

That Kate was cognisant of the importance of this reworking to overall story coherence and interest is evidenced in the following statement:

> I want the reader to be interested. It's pretty important. I read something and have to think that it makes sense to the reader, not just to me. Sometimes it makes sense to me but someone else wouldn't understand it. So I have to go and change things.

Similarly, Robyn had the interests of her reader in mind as she constructed her plot. On one occasion, commenting on the reworking of her text she said:

> (I deleted that) because it didn't sound right. It's like there's a blanket over the house and no one can escape. But I can say it to you now, but to write it down for the reader- it's harder. You can't say 'everyone felt tense', so you say 'a heavy blanket'. It's like a heavy fog.

Both Robyn and Kate were well aware that special techniques had to be employed to convey complex feelings when unable to rely on conversational tools such as inflection, facial expressions and gestures.

While writing, Robyn and Kate rarely referred to their plan. Instead, they had the overall picture of the story firmly in mind. They knew how their plots would develop in general terms and as they typed they formed an appropriate configuration of detail, description and dialogue thus moving the story closer to its climax and ending within the confines of the original plan. For both girls, the procedural guidance acted mainly in a signposting role by reminding them of techniques that could be utilised in developing their stories. As Robyn explained, rather than making a specific responses to an individual prompt, she kept all the prompts "in mind" and used them simultaneously and continuously.

Perhaps the greatest difference between novices and experts in the composing phase was in terms of development and reworking of content and ideas to form a plot. As suggested by Bereiter and Scardamalia (1987) and Polkinhorne (1988) the appropriate configuration or "best fit" emerges only through the reworking procedures comparing interactions between plot structures and events. Both Kate and Robyn continuously reworked their text to generate plot and sub-plot details throughout the composition process. For Michelle and Lee though, there was little, if any, reworking of text during the composition phase. Indeed, the very process of generating ideas and transforming them to text, even with guidance, seemingly placed such strong demands on cognitive processing capacities, that there was little cognitive processing capacity left to deal with the complex task of reworking of ideas.

Analyses of novices' stories suggest that narrative development was constrained for three main reasons. First, both Lee and Michelle had difficulty in generating ideas to serves as bases for plot development. Specifically, they demonstrated little awareness of possible character motivation or intent as a strategy for emplotment. While their plans identified characters and a sequence of events, to which they referred continuously, they weren't embedded in a rich framework of ideas. Rather they seemed "empty shells", written almost exclusively because the *Writing Partner* forced planning before allowing composition to commence. Typically, novices' stories simply ran out of steam with characters having no reason to go anywhere or do anything. Neither Michelle or Lee could conceive of characters' volitional motivation, let alone use such motivations to guide emplotment.

A second major difficulty hindering text construction was novice writers' difficulty in dealing with the "mechanics" of writing. Observations of Michelle and Lee's text creation, and discussions with them about their approaches to writing, suggested that major constraints on writing were imposed by lack of proficiency with sentence construction, punctuation and spelling; dimensions of writing not assisted by the *Writing Partner*. Ostensibly, although working within a "conferencing" approach that

valued the production of ideas first, and mechanics second, both girls were well aware that ultimately, text must conform to standard linguistic conventions.

Difficulties with spelling, clearly constrained text construction for both novice writers. Frequently, once or twice per sentence, Lee was obviously uncertain how to spell a word. At this point she would stop typing mid-sentence and stare unhopefully at the screen for a minute or more. Although she was encouraged to approximate spellings, she found it very discouraging to be so frequently confronted with words that she wanted to write but couldn't spell. Even correctly spelled words were not written automatically. Lee seemed to hesitate before typing many words as if she had to think- ever so briefly- about how they should be spelt. Despite her conscious effort to visualise spelling patterns she generally spelt the word incorrectly. Michelle was less constrained than Lee by poor spelling skills, and more likely to recognise when she couldn't spell a word and seek assistance.

Finally, as indicated earlier, knowledge transforming requires the reworking of ideas to fit what has been written and what is planned. Neither Michelle or Lee engaged in the process of text reworking adopted by the skilled writers. In contrast, observations of the experts' text construction revealed the importance of this "tacking" between story elements to the emergence of appropriate plot structure and narrative style. Integral to this process was their ability to recognise when their text lacked the necessary clarity to convey meaning most effectively.

Revision and editing On completion of the first story draft writers are guided by the *Writing Partner* through the critical process of editing and revision. Because of the wide use of a "process" or "conferencing" approach to writing in Australian elementary schools, year seven students are familiar with drafting and revising procedures. In practice though, the revising phase may not be quite as beneficial as envisaged by its proponents (Florio-Ruane, 1991). Indeed, according to Lee and Michelle the major emphases in classroom revision prior to the *Writing Partner* experiences were on spelling and punctuation, rather than on overall story meaning. Typically, the teacher read the student's story and initiated the corrections; rarely, was the student's understanding of the text the starting point for conference. Needless to say, the students viewed revision as "marking", rather than a collaborative effort to improve story quality. Thus the revision process, at least for the novices, was not considered an integral part of writing.

The first step in the revision process structured by the *Writing Partner* is re-reading the story. Reading the complete narrative text provides a global view of story goals and plot. With this overall picture in mind writers should then be receptive to improving story structure, flow and interest in response to the relevant prompts.

It was at the point of re-reading completed stories that a key difference between the novice and expert writers' revision strategies emerged. This difference was critical because it determined the subsequent revising process. The difference was that the novice writers, unlike the experts, had difficulty in recognising structural problems relating to focus, cohesiveness and continuity (especially, poor expression and grammar) in terms of the overall plot orientation and character development. And as Hayes (1990) has stressed, writers cannot begin to fix or avoid problems unless they can first perceive them.

One technique that helped novices identify lack of clarity in their text was to read stories aloud to themselves. While they were at first self-conscious using this strategy, it proved most beneficial for detecting confusing or grammatically poor expression that affected meaning. It was nevertheless evident, that even with constant monitoring and encouragement, novices read "what they wanted to read" or "what they thought they'd written". Even slow and deliberate reading was influenced by context and superficial

visual cues, such as word length and shape, and the presence of particular letters. Many sentences that simply didn't make sense were read correctly.

Understanding and addressing the difficulties faced by Lee and Michelle's in recognising structural problems that affect text comprehension is a long term project. In the short term, revision with *Writing Partner* support acted to facilitate clarification and elaboration of text meanings. This was effected by encouraging the girls to identify aspects of text that lacked clarity in terms of overall and specific meaning, and then, with a specific reader in mind to focus on the development of a cohesive story line.

Having focussed attention on textual clarity and use of the prompts, difficulties with editing were in essence a continuation of those experienced in the planning and composing phases. These related mainly to plot development and command narrative mechanics. Ultimately, their revision was confined to ensuring that the story "made sense" to the reader. The main improvements were to elaborating and tightening plot so that events and occurrences were linked together in a causal sequence. Integral to this process was attention to structure and expression, including spelling. Generally though, only a word or two in any one sentence was altered, added or deleted; rarely were any text deletions or additions longer than one line.

For Kate and Robyn, who were able to draw on their well developed knowledge of narrative genre conventions, text revision was straightforward. Moreover, as they had engaged in considerable reworking of text during the composition process their narrative schemes were already well organised. Unlike the novices, the experts read their hard copy carefully and systematically from beginning to end, readily identifying potential problems and indicating where changes should occur. Moreover, they were more likely than were the novice writers to voluntarily access prompts relating to story structure, flow and interest.

As in the planning and composing phases, the key difference in novice and expert writers' responses to the procedural facilitations were manifested in the extent to which writing strategies focussed on meaning and overall story coherence. For the experts, the focus on meaning was paramount and occurred at the level of the global story structure. Conversely, the novices concentrated more on fitting events and occurrences to develop story coherence at the sentence and paragraph level. In their chronicling of events, editing emphases were on relating incidents with cohesive devices, and linking them to convey meaning. In effect this meant improving structure at the sentence and paragraph level, rather than the more global level of ideas.

Story quality Overall, the stories written with the assistance of the *Writing Partner* showed improved overall quality. Evaluations of novices' stories according to overall global impression, plot(s), characterisation, mood, setting/time, dialogue, expression and mechanics indicated considerable improvement in most dimensions over the course of the intervention. Figures 1 and 2 show raters' scores for each criterion (out of 10) with higher scores are indicative of the greater extent to which a story manifested features reflective of knowledge transforming processes.

Figure 1
Assessment of Michelle's stories according to criteria reflecting a knowledge transforming approach to writing

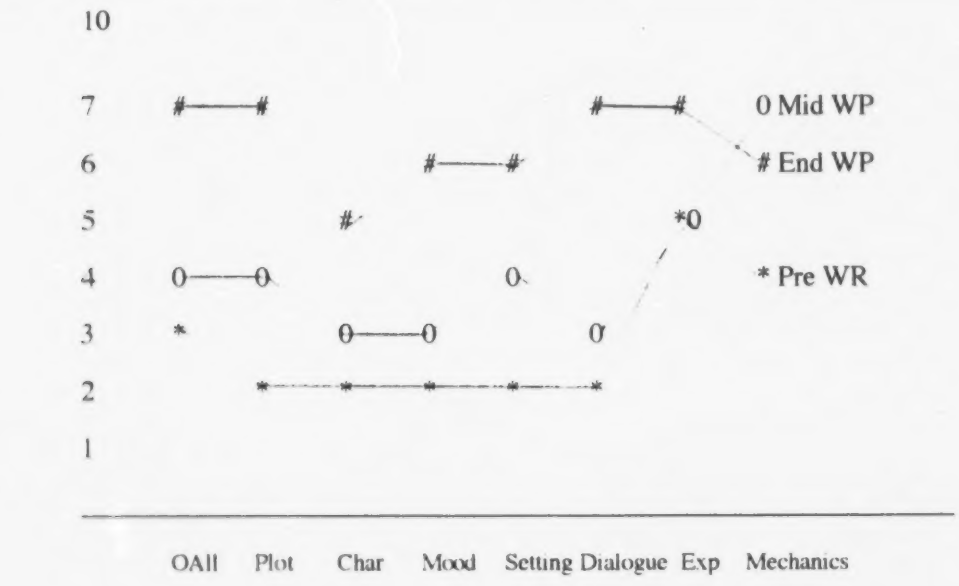
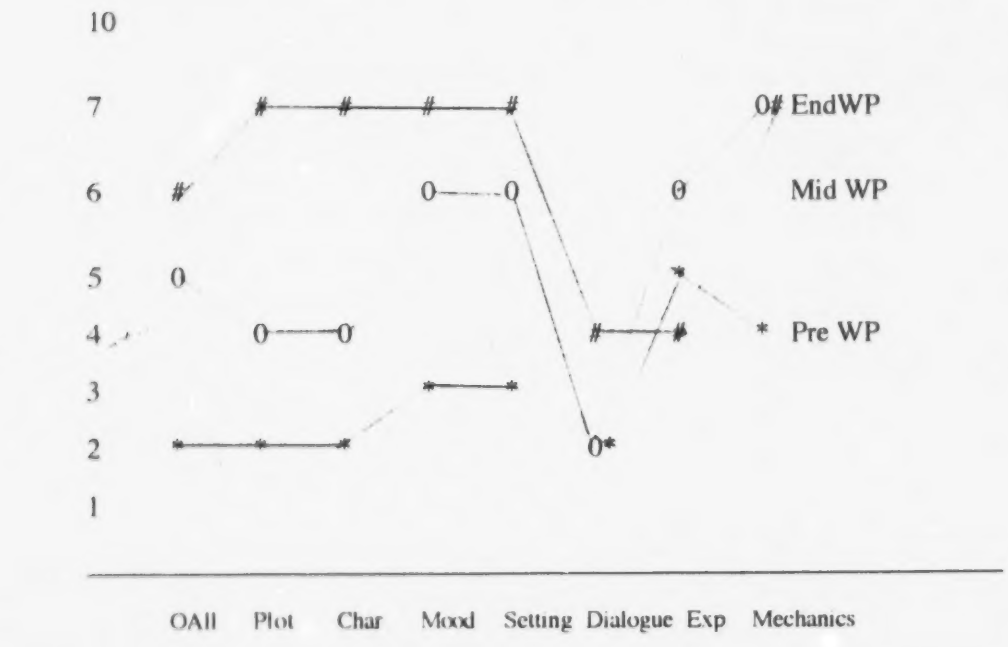


Figure 2

Assessment of Lee's stories according to criteria reflecting a knowledge transforming approach to writing.



Over the course of the *Writing Partner* intervention, the novice writers' stories showed considerable improvement in overall story quality, plot, mood, setting and character development, the dimensions of narrative writing most supported by the *Writing Partner*. In addition, there was some evidence of improved writing mechanics (spelling, punctuation etc.). For expert writers, there was less obvious improvement in writing performance over the intervention period. Their stories, already rated highly (9 or 10) at the beginning of the study, maintained high ratings throughout the study. Improvements for Robyn and Kate were mainly in use of linguistic features, such as lexical and grammatical intricacy, that contributed to plot organisation and overall narrative style. These more subtle text refinements were not assessed by the evaluation procedure.

Comparisons between the overall quality of novice and experts' text construction processes reflected two interrelated features: first, writers' ability to generate and manipulate narrative components (particularly plot and characters), and secondly, knowledge of the stylistic conventions of the narrative genre. Overwhelmingly, experts were better able than novices to generate ideas and then manipulate them to form cohesive narrative structures with purposeful and imaginative settings, situations, events and characters. The extent to which this manipulation of ideas was possible seemed governed by their knowledge of and ability to apply literary conventions of narrative genre. In this sense the procedural facilitations provided by the *Writing Partner* complemented the girls' already well developed understanding of the narrative genre. Additionally, their propensity to voluntarily access the procedural facilitations encouraged a closer monitoring of text construction and revision than may otherwise have occurred. Consistent with Hayes' (1990) view of skilled writers, both Robyn and Kate were sensitive to cues about performance and were much more active than their less skilled peers in accessing and responding to procedural guidance. The complementary nature of these strategies resulted in more sophisticated text structure, particularly in terms of lexical density and grammatical intricacy, than in non-supported contexts.

For novice writers, who were less able to draw on existing knowledge of literary narrative conventions, improvements in overall story quality suggest the usefulness of the procedural facilitations in scaffolding construction of a feasible story. The novices however, as illustrated in the following extracts, did not use the same degree of lexical or grammatical sophistication employed by the experts. Notice in particular, Robyn's control over sentence introductions and sentence patterns compared with those in Lee's text.

Expert writer: Robyn

In the kitchen the next morning the atmosphere was more relaxed. The only problem yet to be resolved was who would take Sarah. Both parents wanted the responsibility... Sarah, hearing her name, looked over her bowl of CoCo Pops. Her face looked up at her mother's and then sadly she shook her head.

Novice writer: Lee

It was a great night. I wore my wonderful silver shoes. At the ball there was a handsome young man. He asked me to dance. I said OK. While we were dancing he told me his name was Tim. He fell in love. I new because he kissed me.

Metacognitive knowledge of story construction Comparisons between novice writers' pre and post *Writing Partner* conceptions of the narrative construction process (as explained to a friend), suggest that the procedural facilitations contributed to internalisation of strategies central to knowledge transforming approaches to writing. Both Lee and Michelle showed considerable gains in their metacognitive knowledge of narrative writing over the period of the intervention. In contrast to their pre *Writing Partner* view of narrative composition as something that just "happened", by the end of the intervention they were more aware of the need for planning, monitoring and revising their text, and of the interdependent nature of these processes. As Lee now said:

> You have to plan story first: make it exciting
> It has to be an exciting story.
> *What makes it exciting?*
> What happens and the characters.
> When you write you have to look at your plans and make up other bits as you go along...You need to think about main character, and pretend you are the character...You'd have to read it as you go to see that it makes sense...Then you have to read it all through and put the paragraphs correct. Then if there's a lot you don't like in the story then you take it out and put something else in. You need to write stories for your own age group so they can understand them.

Similarly, Michelle said:

> You have to think about where to put different words..... to make paragraphs. You have to read (the story) through to see if you've made any spelling mistakes, see if sentences are correct... It has to make sense to the writer and everybody who reads it. When it's all finished then you have to make it make sense and read it through, go to the parts that didn't make sense and see if you can change them.

Importantly, the interviews designed to probe metacognitive knowledge of narrative construction indicated that both girls were more aware that stories needed to be communicated effectively to a reader. Further, Lee's statement: *You'd have to read it as you go to see that it makes sense*, suggests a growing sensitivity to audience framing the whole composition process, not just the planning or revision phase.

Summary and conclusions

Learning to write a narrative that conforms to accepted literary conventions is a complex process that occurs over a long period of time. As expected, the *Writing Partner* intervention did not transform the two novice writers into experts, but with its assistance they made some shifts toward a knowledge transforming approach to writing. As found by Zellermayer et al., (1991), the novice writers' overall story quality improved, as did several key elements of narrative structure. Most encouraging, was evidence of their developing knowledge of processes involved in planning, composing and revising text and a growing facility to orchestrate these processes within a literary narrative framework.

Analyses of the novices' responses to the procedural facilitations support the contention that knowledge transforming strategies can be developed through explication of metacognitive activities such as goal-directed planning guided by mental representations of audience, plot and characterisation. For these writers the procedural facilitations were especially valuable in focusing on both the development and orchestration of specific conventions of narrative genres, especially emplotment, characterisation, mood and setting, as well as writing mechanics, such as punctuation and spelling. Importantly in this study, students were encouraged to see spelling and punctuation as integral to the development of meaning rather than as a stand-alone exercise. Far too often Gilbert (1990) suggests, the importance of linguistic features in transforming ideas to meaningful written communications is underestimated in the teaching of writing.

Expert writers too, showed improvements in overall story quality, but as they were already accomplished writers for their age, movements within the knowledge transforming model were more subtle. Their improvements were manifested in the increased sophistication of emplotment and linguistic conventions characteristic of narrative genres. There was no evidence of substantial gains in their understanding of the metacognitive processes involved in story writing.

At the end of the intervention the gap between novice and experts' narrative writing competence had closed somewhat. Novices' texts displayed greater familiarity with the conventions of narrative genre and novices were better able to articulate some of the metacognitive demands of good writing. Encouragingly, this improved metacognitive

awareness suggests an internalisation of the procedural facilitations. And, with a more sustained focus on the conventions of narrative genres and processes embodied in the knowledge transforming approach I would expect a continuing development of narrative competence. Clearly, given the complexity of narrative genres, the ten week period of the *Writing Partner* intervention was not intended to effect a transition from knowledge telling to knowledge transforming.

The most salient feature emerging from these analyses of writer behaviour is that novices became increasingly aware of the need to manipulate content, plot, characters and causal structures, and of the metacognitive strategies necessary to effect interaction between story components. They were not however able to reprocess knowledge and rework text in the same way as were the more mature writers. Unlike the experts, they were seemingly unable to generate thoughts through the composing process itself. As mentioned elsewhere their plans were arid and barren- essentially "empty shells". Thus there was no rich framework of ideas, either existing or evolving, from which to generate and sustain the thoughts and perceptions of characters and the direction and purpose of plot. If this idea framework did exist, it was not articulated, nor were Lee and Michelle able to employ the linguistic devices required for its transformation to written text.

The knowledge transforming model requires the transformation and reworking of ideas for successful narrative development. This is obviously a process that develops very slowly and with much experience of narrative structures. But it is also one that requires specific guidance. Given the improved narrative structures developed with *Writing Partner* assistance, I predict that continued metacognitive support of this kind, concomitant with access to a rich idea base and better text mechanic skills will promote the process of reworking and transforming ideas for developing writers. Clearly, though, the processes by which students successfully calibrate ideas and knowledge within narrative genres is not well understood. Nor is their any certainty about ways of promoting narrative competence. Certainly, the educational potential of computer-supported procedural facilitations is promising because of the individualised, continuing and non-threatening nature of the guidance afforded through the scaffolding process. There is however much to be learned about the effects of cognitive scaffolding on the development of writing competence, and under what circumstances it might ultimately afford the best support for text construction.

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